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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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Seok-Soon Kim

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06/08/2009

THE NATH LAW GROUP

112 South West Street

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EXAMINER

MOWLA, GOLAM

ART UNIT

PAPER NUMBER

1795

MAIL DATE

DELIVERY MODE

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/762,479	Applicant(s) KIM ET AL.	
	Examiner GOLAM MOWLA	Art Unit 1795	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 03/31/2009.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1, 2 and 4 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1, 2 and 4 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

FINAL ACTION

Response to Amendment

1. Applicant's amendment of 03/31/2009 does not place the Application in condition for allowance.
2. Claims 1, 2 and 4 are pending. Applicant has amended claim 1, and canceled claims 3 and 5-14.

Status of the Rejections

3. The rejections of claims 1, 2 and 4 from the office Action mailed on 05/12/2008 are withdrawn in view of Applicant's amendment to claim 1. However, upon consideration, a new ground of rejection under 35 U.S.C. 103 is presented below.
4. The amendment filed 03/31/2009 is objected to under 35 U.S.C. 132(a) because it introduces new matter into the disclosure. 35 U.S.C. 132(a) states that no amendment shall introduce new matter into the disclosure of the invention. The added material which is not supported by the original disclosure is as follows:

Claim 1 recites the limitation "forming a counter electrode including nanocrystalline platinum and an amorphous, porous metal oxide on the substrate" in lines 4-5. However, the original disclosure does not provide support for "an amorphous, porous metal oxide". The disclosure shows "an amorphous metal oxide" in [0008], [0028], [0034], [0039] or "a porous crystalline metal oxide" in [0011] of specification, but does not disclose an amorphous metal oxide being porous. Applicant is asked to clarify.

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Applicant is required to cancel the new matter in the reply to this Office Action.

Claim Rejections - 35 USC § 112

5. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

6. Claims 1, 2 and 4 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

Claim 1 recites the limitation "forming a counter electrode including nanocrystalline platinum and an amorphous, porous metal oxide on the substrate" in lines 4-5. However, the original disclosure does not provide support for "an amorphous, porous metal oxide". The disclosure shows "an amorphous metal oxide" in [0008], [0028], [0034], [0039] or "a porous crystalline metal oxide" in [0011] of specification, but does not disclose the amorphous metal oxide being porous. Applicant is asked to clarify.

Claim Rejections - 35 USC § 103

7. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

8. Claims 1, 2 and 4 are rejected under 35 U.S.C. 103(a) as being unpatentable over Park et al. ("Pt-WO_x electrode structure for thin-film fuel cells") in view of Mussy et

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al. ("Characterisation and behaviour of Ti/TiO₂/noble metal anodes," *Electrochimica Acta.*, Volume 48, Issue 9, Pages 1131-1141).

Regarding claim 1, Park discloses a method for fabricating a counter electrode (Pt-WO_x two-phase electrode, paragraph 2), the method comprising:

- co-sputtering platinum (Pt target material, paragraph 3) and a metal oxide (WO₃ target material, paragraph 3) as target materials onto a substrate (ITO coated transparent glass substrate, paragraph 3); and
- forming counter electrode (Pt-WO_x nanostructured alloy electrode, paragraph 2) including nanocrystalline platinum (nanosized Pt crystalline phase of 4-5 nm shown as the dark portions of the images in Figure 1 and discussed in paragraph 4) and an amorphous, porous metal oxide (amorphous, porous tungsten oxidative phase discussed in paragraph 4 and shown as the "relatively bright region" in the TEM image of the electrode in Figure 1) on the substrate, wherein the counter electrode has a non-layered structure (the method disclosed by Park et al. yields an amorphous metal oxide)

Park further discloses that the porous material can be selected from porous oxide such as metal oxide (page 907, col. 1). However, the reference is silent as to whether the metal oxide is a titanium oxide.

Mussy discloses a metal anode wherein the metal oxide is titanium oxide wherein the platinum is doped to allow for a stable anode or counter electrode (see abstract, Experimental, Results and Discussion, and figures).

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It would have been obvious to one of ordinary skill in the art at the time of the invention to have used the titanium oxide as the porous oxide in the method of Park to allow for a sable counter electrode as shown by Mussy.

Examiner also notes that the preamble of the instant claim has not been given any patentable weight as it merely recites the purpose of the process and the intended use of the resulting structure, while the body of the claim does not depend on the preamble for completeness and the process steps and structural limitations are able to stand alone (MPEP §2112.02).

Regarding claims 2 and 4, the titanium oxide inherently has a refractive index of 2 or higher and an electric conductivity of 0.1 S/m or more. Examiner notes that claiming of an unknown property which is inherently present in the prior art does not necessarily make the claim patentable. *In re Best*, 562 F.2d 1252, 1254, 195 USPQ 430, 433 (CCPA 1977).

9. Claims 1, 2 and 4 are rejected under 35 U.S.C. 103(a) as being unpatentable over Park in view of Avalor et al. ("Characterization of TiO₂ films modified by platinum doping", Thin Solid Films, 210 (1992) 7-17).

Regarding claim 1, Park discloses a method for fabricating a counter electrode (Pt-WO_x two-phase electrode, paragraph 2), the method comprising:

- co-sputtering platinum (Pt target material, paragraph 3) and a metal oxide (WO₃ target material, paragraph 3) as target materials onto a substrate (ITO coated transparent glass substrate, paragraph 3); and

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- forming counter electrode (Pt-WO_x nanostructured alloy electrode, paragraph 2) including nanocrystalline platinum (nanosized Pt crystalline phase of 4-5 nm shown as the dark portions of the images in Figure 1 and discussed in paragraph 4) and an amorphous, porous metal oxide (amorphous, porous tungsten oxidative phase discussed in paragraph 4 and shown as the “relatively bright region” in the TEM image of the electrode in Figure 1) on the substrate, wherein the counter electrode has a non-layered structure (the method disclosed by Park et al. yields an amorphous metal oxide)

Park further discloses that the porous material can be selected from porous oxide such as metal oxide (page 907, col. 1). However, the reference is silent as to whether the metal oxide is a titanium oxide.

Avalle discloses an electrode (cathode) comprising titanium oxide on which Pt particle is deposited (see abstract, Experimental, Results and Discussion) to allow for an electrode with high catalytic activity (see conclusion).

It would have been obvious to one of ordinary skill in the art at the time of the invention to have used the titanium oxide as the porous oxide in the method of Park to allow for an electrode with high catalytic activity, as shown by Avalle.

Examiner also notes that the preamble of the instant claim has not been given any patentable weight as it merely recites the purpose of the process and the intended use of the resulting structure, while the body of the claim does not depend on the

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preamble for completeness and the process steps and structural limitations are able to stand alone (MPEP §2112.02).

Regarding claims 2 and 4, the titanium oxide inherently has a refractive index of 2 or higher and an electric conductivity of 0.1 S/m or more. Examiner notes that claiming of an unknown property which is inherently present in the prior art does not necessarily make the claim patentable. *In re Best*, 562 F.2d 1252, 1254, 195 USPQ 430, 433 (CCPA 1977).

10. Claims 1, 2 and 4 are rejected under 35 U.S.C. 103(a) as being unpatentable over Park in view of Macpherson et al. ("Conducting-Atomic Force Microscopy Investigation of the Local Electrical Characteristics of a Ti/TiO₂/Pt Anode", *Electrochemical and Solid-State Letters*, 4 (9) E33-E36 (2001)).

Regarding claim 1, Park discloses a method for fabricating a counter electrode (Pt-WO_x two-phase electrode, paragraph 2), the method comprising:

- co-sputtering platinum (Pt target material, paragraph 3) and a metal oxide (WO₃ target material, paragraph 3) as target materials onto a substrate (ITO coated transparent glass substrate, paragraph 3); and
- forming counter electrode (Pt-WO_x nanostructured alloy electrode, paragraph 2) including nanocrystalline platinum (nanosized Pt crystalline phase of 4-5 nm shown as the dark portions of the images in Figure 1 and discussed in paragraph 4) and an amorphous, porous metal oxide (amorphous, porous tungsten oxidative phase discussed in paragraph 4 and shown as the "relatively bright region" in the TEM image of the

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electrode in Figure 1) on the substrate, wherein the counter electrode has a non-layered structure (the method disclosed by Park et al. yields an amorphous metal oxide)

Park further discloses that the porous material can be selected from porous oxide such as metal oxide (page 907, col. 1). However, the reference is silent as to whether the metal oxide is a titanium oxide.

Macpherson discloses an electrode (anode) comprising porous titanium oxide which is supported by the Pt particle (see abstract, Experimental, Results and Discussion) to allow for an electrode which is environment friendly (see col. 1 on page E33).

It would have been obvious to one of ordinary skill in the art at the time of the invention to have used the titanium oxide as the porous oxide in the method of Park to allow for an electrode which is environment friendly, as shown by Macpherson.

Examiner also notes that the preamble of the instant claim has not been given any patentable weight as it merely recites the purpose of the process and the intended use of the resulting structure, while the body of the claim does not depend on the preamble for completeness and the process steps and structural limitations are able to stand alone (MPEP §2112.02).

Regarding claims 2 and 4, the titanium oxide inherently has a refractive index of 2 or higher and an electric conductivity of 0.1 S/m or more. Examiner notes that claiming of an unknown property which is inherently present in the prior art does not

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necessarily make the claim patentable. *In re Best*, 562 F.2d 1252, 1254, 195 USPQ 430, 433 (CCPA 1977).

Response to Arguments

11. Applicant's arguments with respect to claims 1, 2 and 4 have been considered but are moot in view of the new ground(s) of rejection as necessitated by the amendments.

Applicant argues that "in accordance with the presently claimed subject matter, the metal oxide is an amorphous, porous TiO_2 . Mahe fails to teach this claim feature since it merely discloses a Ta/ Ta_2O_5 /Pt electrode" (see Remarks, page 4).

This argument is directed to the claim as amended and is moot in view of new ground of rejection as presented above.

Applicant also argues that "the claimed subject matter leads to unexpected results, which cannot be derived from each teaching of Mahe or Park. The refractive index of TiO_2 ($n = 2.3-2.5$) of the present application is much higher than any of the refractive indices of Mahe's Ta_2O_5 ($n = 2.1$) and Park's WO_x ($n = 1.7-1.8$)" (page 5 of Remarks).

Examiner respectfully disagrees. Refractive index is an inherent property of metal oxide and claiming of an unknown property which is inherently present in the prior art does not necessarily make the claim patentable. *In re Best*, 562 F.2d 1252, 1254, 195 USPQ 430, 433 (CCPA 1977).

Conclusion

12. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Correspondence/Contact Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to GOLAM MOWLA whose telephone number is (571) 270-5268. The examiner can normally be reached on M-F, 0900-1700 EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, ALEXA NECKEL can be reached on (571) 272-1446. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/G. M./
Examiner, Art Unit 1795

/Alexa D. Neckel/
Supervisory Patent Examiner, Art Unit 1795